Prioritizing multiple health behavior change research topics: expert opinions in behavior change science

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Cite this as: *TBM* 2016;6:220–227
doi: 10.1007/s13142-015-0381-5

Abstract

Multiple health behavior change (MHBC) approaches are understudied. The purpose of this study is to provide strategic MHBC research direction. This cross-sectional study contacted participants through the Society of Behavioral Medicine email listservs and rated the importance of 24 MHBC research topics (1 = not at all important, 5 = extremely important) separately for general and underserved populations. Participants ($n = 76$) were 79 % female; 76 % White, 10 % Asian, 8 % African American, 5 % Hispanic, and 1 % Native Hawaiian/Pacific Islander. Top MHBC research priorities were predictors of behavior change and the sustainability, long-term effects, and dissemination/translation of interventions for both populations. Recruitment and retention of participants ($t(68) = 2.17$, $p = 0.000$), multi-behavioral indices ($t(68) = 3.54$, $p = 0.001$), and measurement burden ($t(67) = 5.04$, $p = 0.001$) were important for the underserved. Results identified the same top research priorities across populations. For the underserved, research should emphasize recruitment, retention, and measurement burden.

Keywords

Multiple health behavior change (MHBC), Research, Recommendations, Interventions, Theory, Measurement

INTRODUCTION

The highest morbidity and mortality due to chronic diseases (diabetes, cancer, heart disease, and obesity) are strongly associated with a number of health behaviors [1]. The World Health Organization concluded in their 2005 report, “Preventing Chronic Diseases: A Vital Investment,” that modifiable risk factors, otherwise known as lifestyle behaviors, can explain the majority of chronic diseases (which account for 60 % of all deaths) across all demographics and geographic regions [2]. For example, more than 1/3 of adults do not meet national recommendations for physical activity [3], only 24 % consume the recommended servings of fruit and vegetables [4], 1 in 5 Americans regularly smoke [5], and 30 % report excessive alcohol use [6].

Health-risk behaviors that signify the lifestyle of most sick or at-risk populations are closely clustered [7–12] and are strong contributors to mortality and healthcare costs [13, 14]. Replacing health-risk behaviors with behaviors that characterize a healthy lifestyle can

Implications

Practice: Specifically for underserved populations, MHBC practitioners need to creatively address and improve recruitment and retention of participants, consider and minimize measurement burden, and relatedly implement MHBC indices to track progress.

Policy: Policy makers should use these results toward devoting resources and developing policies that address participant recruitment and retention, measurement burden, and creation and standardization of multi-behavioral indices.

Research: MHBC research should focus on measuring predictors of behavior change, improving sustainability, dissemination/translation of MHBC interventions and addressing the long-term effects.

reduce both the health and the economic burden of chronic disease [15]. If successful, the widespread adoption of healthy lifestyle is estimated to save over \$16 billion in annual medical costs [16]. Further, prospective studies report strong and explicit evidence that characteristics of a healthy lifestyle increase longevity, including regular physical activity, cancer screening, non-smoking/cessation, low alcohol intake, a healthy diet, and normal body mass index (BMI) [17–22]. Moreover, adoption of as little as 3 healthy behaviors is estimated to reduce chronic disease by 68 to 71 % [19]. Higher quality of life is also impacted by lifestyle, with those adopting 4 healthy behaviors being 7 times more likely to rate their health as excellent than individuals reporting no healthy behaviors [23]. Healthy lifestyle promotion has gained popularity. For instance, multiple behavior interventions have demonstrated recent successful lifestyle changes among primary care patients and those with colon cancer, type-2 diabetes, and worksite employees [24–28].

Multiple health behavior change (MHBC) interventions have strong potential to advance health promotion, increase health benefits and quality of life, and reduce healthcare costs [15]. Research in this area has gained popularity since the seminal MHBC special issue of *Preventive Medicine* in 2008 documenting the

status of MHBC science. Likely due to their interdisciplinary nature, behavioral health scientists and practitioners seem motivated to incorporate MHBC research concepts into their programs. Several pioneering behavioral scientists have reviewed the literature on MHBC science and summarized the information available. This includes definitions of current topics [29], theory [30, 31], quantitative methods [32], interventions [33, 34], benefits and challenges [15], and future directions [35]. In March 2013, another special collection of MHBC articles were published in this journal, *Translational Behavioral Medicine*. These recent contributions strengthen the MHBC field by documenting the extension of MHBC interventions to new populations (e.g., youth juvenile systems, work-sites), by examining longitudinal relationships, and by expanding on methods used in MHBC research (e.g., longitudinal studies, studies using national data, comparing and quantifying change) [36]. Despite these accomplishments, MHBC approaches remain understudied where the growth of the MHBC field may be stunted by inconsistent and varied measurement, methodological issues, and a lack of understanding of behavior change theory. Further, it is not known if MHBC issues are similar or different in minority/underserved versus general populations. A strategic consensus among experts in the field on research priorities would be helpful to advance theory, measurement, interventions, and MHBC practice in a timely fashion.

Therefore, the purpose of this study was to provide strategic direction to the emerging MHBC field by identifying and comparing research priorities for both general and underserved/minority populations. As junior and senior researchers may have different priorities based upon their experience in the field, we explored differences for age, years in MHBC research, and years after a terminal degree. Results provide recommendations for the advancement of MHBC science.

METHODS

Design

This study is a cross-sectional design.

Participants

Participants consisted of individuals from the Society of Behavioral Medicine (SBM) Special Interest Group (SIG) email listservs—about 2000 people have registered an email with the SBM SIG listservs. This population was chosen for several reasons. (a) The MHBC SIG led the compilation of the 2008 *Preventive Medicine* MHBC special issue. (b) SBM SIG members include interdisciplinary professionals from affiliated organizations such as non-profits, research, government, student, and academic institutions. (c) SBM SIGs include chronic disease foci (Cancer SIG, Diabetes SIG, Multi-Morbidities SIG, Obesity and Eating Disorders SIG, Pain SIG); population foci (Child and Family Health

SIG, Ethnic Minority and Multicultural Health SIG, Military and Veteran's Health SIG, Student SIG, Women's Health SIG), and process foci (Complementary and Integrative Medicine SIG, Evidence Based Behavioral Medicine SIG, Health Decision Making SIG, Integrated Primary Care SIG, Multiple Health Behavior Change SIG, Spirituality SIG, Theories and Techniques of Behavior Change SIG), among others, which all include aspects of MHBC research.

Measures

An online survey addressing the importance of several specific research topics in the MHBC research field was developed. Surveys asked for the following demographic information: age, gender, ethnicity, highest degree held, years since terminal degree, years spent addressing MHBC research, primary discipline, and primary work responsibility. Then, participants rated the importance of 24 research priority topics separately for the general population and for the underserved/minority population (i.e., 48 ratings per participant). "General" and "underserved/minority" were self-defined by the participants. MHBC research was defined as research addressing more than one health behavior. Research priorities were presented categorically (MHBC theory, MHBC measurement, and MHBC interventions) for ease in understanding (see Tables 1, 2, and 3 for complete lists of research priorities rated) and were derived from concepts that arose in the MHBC special issue (volume 46) of *Preventive Medicine* in 2008. Rating options were given using a five-point Likert scale (1 = not at all important, 2 = a little important, 3 = moderately important, 4 = very important, 5 = extremely important). At the end of each research priority category, participants were given the option to identify additional needs with open-ended responses (but no participants utilized this option).

Procedure

The University of Hawaii Institutional Review Board approved all aspects of this study and the study was conducted within the ethical standards of the Helsinki Declaration of 1975, as revised in 2000.

Emails were sent to all SBM SIG listservs which included about 2000 members in the beginning of March 2012 and once again in the beginning of April 2012. Data collection ceased on the last day of April. Before beginning the survey, participants were asked to read an online consent form that informed them of the study purpose, their participant rights, and they were instructed that the completion of the survey is considered consent. Participants were also informed that their involvement in the study required about 15 min of their time and they were given a hyperlink to an online survey using Survey Monkey. We were unable to determine how many did not open the email request, deleted the email request without reading it, or read the email request and then decided not to participate.

Table 1 | Multiple health behavior change (MHBC) research priorities for general and underserved/minority populations

General population						Underserved/minority population					
Rank	Type	Item	N	Mean ^a	SD	Rank	Type	Item	N	Mean ^a	SD
1	INT	Sustainability	74	4.58	0.66	1	INT	Sustainability	70	4.59	0.63
2	INT	Long-term effects	75	4.51	0.71	2	TH	Predictors of behavior change	71	4.45	0.75
3	TH	Predictors of behavior change	76	4.36	0.73	3	INT	Dissemination/translation	70	4.44	0.77
4	INT	Dissemination/translation	75	4.36	0.71	4	INT	Long-term effects	67	4.43	0.76
5	TH	Mediator of behavior change	75	4.35	0.74	5	INT	Feasibility	69	4.38	0.73
6	INT	Integration of behaviors	74	4.35	0.69	6	INT	Tailored programs	70	4.37	0.82
7	INT	Feasibility	75	4.31	0.77	7	TH	Moderators of behavior change	70	4.36	0.76
8	TH	Moderators of behavior change	76	4.29	0.75	8	TH	Mediator of behavior change	71	4.31	0.82
9	TH	Influence of one behavior to another	75	4.27	0.79	9	INT	Recruitment and retention	70	4.31**	0.77
10	TH	Common predictors across behaviors	76	4.24	0.85	10	TH	Common predictors across behaviors	70	4.27	0.76
11	INT	Tailored programs	75	4.23	0.80	11	TH	Influence of one behavior to another	71	4.23	0.81
12	MS	Validation of instruments	76	4.09	1.01	12	INT	Integration of behaviors	69	4.23	0.81
13	INT	Cost	75	4.05	0.85	13	INT	Cost	70	4.23	0.85
14	INT	Treatment fidelity	75	3.97	0.85	14	MS	Validation of instruments	70	4.17	0.98
15	INT	Co-action of behaviors	75	3.91	0.72	15	MS	Multi-behavioral indices	70	4.10**	0.84
16	INT	Recruitment and retention	75	3.87**	0.86	16	MS	Measurement burden	70	4.01**	0.94
17	INT	Simultaneous v. sequential	75	3.84	0.75	17	INT	Treatment fidelity	70	3.99	0.93
18	MS	Statistical techniques	76	3.79	0.97	18	INT	Co-action of behaviors	70	3.93	0.73
19	MS	Multi-behavioral indices	76	3.75**	0.91	19	INT	Simultaneous v. sequential	70	3.91	0.78
20	TH	MHBC Theory/models	76	3.64	1.06	20	TH	MHBC Theory/models	71	3.80	0.97
21	TH	Theory testing	75	3.64	1.05	21	MS	Statistical techniques	70	3.74	1.03
22	MS	Measurement burden	75	3.56**	0.99	22	TH	Theory testing	71	3.72	1.00
23	TH	Theory comparison	76	3.34	1.04	23	MS	Equating units of behavioral measures	70	3.57	1.11
24	MS	Equating units of behavioral measures	76	3.33	1.12	24	TH	Theory comparison	70	3.50	1.03

TH theory, MS measurement, INT intervention

^a Scale: 1 = not at all important, 2 = a little important, 3 = moderately important, 4 = very important, 5 = extremely important

**Paired *t* test was used to compare the mean difference between the general population and the underserved population for each item, significant at $p < 0.002$ using the Bonferroni method for multiple comparison adjustment ($p = 0.05/24$ items)

Table 2 | *T* test for differences in means for general population between the median split (age, years in multiple health behavior change research (MHBC), and years after terminal degree)

Type	Item	Age		Years in MHBC research				Years after terminal degree			
		≤33	>33	Mean ^a	SD	Mean ^a	SD	Mean ^a	SD	Mean ^a	SD
INT	Sustainable	4.63	0.59	4.53	0.74	4.63	0.67	4.53	0.66	4.65	0.54
INT	Long-term effects	4.55	0.72	4.43	0.69	4.47	0.75	4.54	0.66	4.54	0.73
INT	Integration of behaviors	4.50	0.56	4.18	0.79	4.41	0.64	4.29	0.75	4.44	0.56
INT	Dissemination/translation	4.29	0.69	4.43	0.73	4.35	0.70	4.37	0.73	4.35	0.68
INT	Feasibility	4.29	0.80	4.31	0.75	4.43	0.71	4.17	0.82	4.27	0.77
INT	Tailored	4.26	0.72	4.26	0.88	4.30	0.69	4.14	0.91	4.27	0.73
INT	Cost	4.00	0.87	4.09	0.84	4.07	0.83	4.03	0.89	3.97	0.90
INT	Treatment fidelity	3.95	0.96	4.03	0.75	3.95	0.88	4.00	0.84	3.92	0.83
INT	Simultaneous v. sequential	3.89	0.80	3.77	0.71	3.82	0.71	3.86	0.81	3.84	0.76
INT	Recruitment and retention of participants	3.87	0.78	3.89	0.95	3.98	0.83	3.74	0.89	3.95	0.82
INT	Co-action of behaviors	3.84	0.72	3.97	0.73	3.88	0.79	3.94	0.64	3.86	0.67
MS	Validation of instruments	3.95	1.06	4.25	0.94	4.05	1.01	4.14	1.02	4.00	1.08
MS	Statistical techniques	3.82	1.06	3.75	0.88	3.78	0.97	3.81	0.98	3.65	1.03
MS	Multi-behavioral indices	3.79	0.88	3.72	0.96	3.80	0.94	3.69	0.89	3.76	0.93
MS	Measurement burden	3.55	1.03	3.57	0.96	3.41	1.04	3.72	0.91	3.39	1.08
MS	Equating units of behavioral measures	3.45	1.06	3.22	0.88	3.35	1.03	3.31	1.24	3.32	1.06
TH	Predictors of behavior change	4.32	0.70	4.39	0.76	4.23	0.77	4.50	0.66	4.24	0.72
TH	Mediators of behavior change	4.21	0.81	4.51	0.65	4.23	0.80	4.49	0.66	4.16*	0.83
TH	Influence of one behavior to another	4.19	0.81	4.36	0.78	4.13	0.80	4.42	0.77	4.25	0.81
TH	Moderators of behavior change	4.13	0.74	4.47	0.72	4.15	0.77	4.44	0.70	4.11*	0.77
TH	Common predictors across behaviors	4.11	0.89	4.42	0.79	4.00*	0.91	4.50*	0.70	4.22	0.92
TH	Theory testing	3.43	0.99	3.81	1.08	3.44	1.17	3.86	0.87	3.47	1.16
TH	MHBC Theory/models	3.39*	1.05	3.86*	1.01	3.40*	1.13	3.92*	0.91	3.46	1.15
TH	Theory comparison	3.13	0.99	3.56	1.06	3.20	1.07	3.50	1.00	3.16	1.12

TH theory, MS measurement, INT intervention

^a Scale: 1 = not at all important, 2 = a little important, 3 = moderately important, 4 = very important, 5 = extremely importantNote: paired *t* test was used to compare the mean difference between the groups based on a median split for each item, significant at $p < 0.002$ using the Bonferroni method for multiple comparison adjustment ($p = 0.05/24$ items), no significant results were found; * represents a non-significant trend at $p < 0.05$

Table 3 | *T*-test for means for underserved/minority population between the median split (age, years in multiple health behavior change research (MHBC), and years after terminal degree)

Type	Item	Age		Years in MHBC research				Years after terminal degree			
		≤33		≤4.5		>4.5		≤3.5		>3.5	
		Mean ^a	SD	Mean ^a	SD	Mean ^a	SD	Mean ^a	SD	Mean ^a	SD
INT	Sustainability	4.60	0.60	4.59	0.66	4.65	0.59	4.52	0.67	4.59	0.61
INT	Long-term effects	4.50	0.75	4.39	0.78	4.50	0.81	4.35	0.71	4.55	0.75
INT	Integration of behaviors	4.26	0.78	4.19	0.85	4.22	0.87	4.24	0.75	4.24	0.66
INT	Dissemination/translation	4.49	0.74	4.47	0.81	4.51	0.77	4.36	0.78	4.50	0.75
INT	Feasibility	4.40	0.78	4.35	0.69	4.51	0.73	4.22	0.71	4.44	0.75
INT	Tailored program	4.49	0.70	4.34	0.77	4.51	0.69	4.21	0.93	4.53	0.66
INT	Cost	4.23	0.88	4.22	0.84	4.27	0.90	4.18	0.81	4.24	0.89
INT	Treatment fidelity	3.89	0.99	4.19	0.85	4.00	1.05	3.97	0.77	3.97	0.94
INT	Simultaneous v. sequential	3.97	0.79	3.81	0.77	3.92	0.72	3.91	0.84	3.94	0.69
INT	Recruitment and retention	4.46	0.70	4.22	0.82	4.46	0.73	4.15	0.80	4.41	0.70
INT	Co-action of behaviors	3.91	0.70	3.94	0.77	4.03	0.69	3.82	0.77	3.97	0.63
MS	Validation of instruments	4.12	1.01	4.27	0.96	4.22	0.96	4.12	1.01	4.21	0.96
MS	Statistical techniques	3.88	1.07	3.58	0.99	3.83	1.03	3.65	1.04	3.70	0.98
MS	Multi-behavioral indices	4.15	0.78	4.06	0.89	4.08	0.84	4.12	0.84	4.21	0.74
MS	Measurement burden	4.00	0.99	4.00	0.91	3.92	1.03	4.12	0.84	3.88	0.99
MS	Equating units of behavioral measures	3.76	0.96	3.39	0.23	3.78	0.99	3.35	1.20	3.67	0.89
TH	Predictors of behavior change	4.49	0.66	4.39	0.84	4.49	0.73	4.41	0.78	4.44	0.66
TH	Mediators of behavior change	4.29	0.75	4.39	0.89	4.35	0.89	4.26	0.75	4.29	0.76
TH	Influence of one behavior to another	4.26	0.74	4.18	0.89	4.24	0.72	4.21	0.91	4.35	0.69
TH	Moderators of behavior change	4.34	0.73	4.44	0.81	4.41	0.80	4.30	0.73	4.35	0.73
TH	Common predictors across behaviors	4.34	0.68	4.25	0.83	4.24	0.72	4.30	0.81	4.38	0.65
TH	Theory testing	3.46*	0.95	3.97*	1.00	3.59	1.04	3.85	0.96	4.32	1.05
TH	MHBC theory/models	3.57*	1.04	4.09*	0.85	3.73	1.05	3.88	0.88	3.71	0.97
TH	Theory comparison	3.23*	1.00	3.72*	1.00	3.41	1.07	3.61	1.00	3.29	1.09
TH theory, MS measurement, INT intervention											

^a Scale: 1 = not at all important, 2 = a little important, 3 = moderately important, 4 = very important, 5 = extremely important

Note: paired *t*-test was used to compare the mean difference between the groups based on a median split for each item, significant at $p < 0.002$ using the Bonferroni method for multiple comparison adjustment ($p = 0.05/24$ items), no significant results were found; * represents a non-significant trend at $p < 0.05$

After reading the consent form, survey participants reported their demographics (age, gender, ethnicity, highest degree held, years since terminal degree, years spent addressing MHBC research, primary discipline, and primary work responsibility). Then, participants rated the importance of several MHBC research topics separately for both the general population and underserved/minority populations.

Analyses

All analyses were conducted with SPSS Version 20 for Windows (SPSS, Inc. Chicago, IL). First, descriptive analysis determined the mean and standard deviation of each research priority for each population group. Then, the mean importance score of each research priority was sorted in descending order, which provided a descriptive ranking for both the general population and the underserved/minority population. Paired *t* tests were used to determine if each research priority's mean importance score was significantly different between these population groups. Further exploratory analysis examined differences for age, years in MHBC research, and years after a terminal degree. Due to multiple hypothesis testing, the *t* test significance values are set and interpreted at $p=0.002$ using the Bonferroni method for multiple comparison adjustment ($p=0.05/24$ items). Missing data ranged from 0 to 12 % with a mean of 4.4 % and appeared at random, thus was deleted pairwise.

RESULTS

Of the 95 individuals who started the online survey, 80 % ($n=76$) completed it. These 76 respondents were 79 % female and 76 % White, 10 % Asian, 8 % African American, 5 % Hispanic, and 1 % Native Hawaiian/Pacific Islander; and 60 % held a doctoral degree. On average, it had been 7.2 years ($SD=8.7$, range=0–31) since the respondents had completed their terminal degrees. Respondents identified their disciplines as psychology (53 %), public health (24 %), nursing (6 %), medicine (3 %), social work (1 %), or other (13 %). Primary work responsibilities were research (72 %), teaching (10 %), clinical practice (9 %), and other (9 %).

All indicators were, on average, rated at least moderately important (score >3). Table 1 presents mean ratings of the research priority items, from highest to lowest. The top 4 MHBC research priorities for both the general and the underserved/minority population are sustainable interventions, long-term effects of interventions, predictors of behavior change, and dissemination/translation of interventions.

Similarly, the behavioral science community identified 4 topics of least importance for MHBC research for both the general and the minority/underserved population: MHBC theory/models, theory testing, theory comparison, and equating units of behavioral measures to another. Of note, no participants provided their own research priorities in the open-ended items.

When considering the general population and the underserved/minority population separately, the community of behavioral health scientists ranked 21 research priorities similarly between the general and underserved/minority population ($p>0.002$). Only 3 research priorities were rated as significantly more important for research on the underserved/minority population than for the general population (see Table 1): recruitment and retention of participants ($t(68)=2.17$, $p=0.000$), multi-behavioral indices ($t(68)=3.54$, $p=0.001$), and measurement burden ($t(67)=5.04$, $p=0.001$).

Additional analysis examined the differences in research priorities based on age, years in MHBC research, and years after a terminal degree. Because these demographic variables were negatively skewed, each group was divided into two subgroups based on a median split, and an independent sample *t* test was conducted to compare the mean difference between two subgroups. Although most of the research topics were rated similarly (they did not approach $p<0.002$), a trend emerged ($p<0.05$) where those who were above the median split for age (34 or older), years involved in MHBC research (more than 4.5), and years since terminal degree (more than 3.5) rated theory items higher than their counterparts (see Tables 2 and 3).

DISCUSSION

Overall, results found that MHBC research priorities are largely similar for both the general and the underserved/minority population. The MHBC field is still relatively early in its development but should immediately focus on developing sustainable interventions that have lasting effects such as capacity building, systems changes, and policy and environmental changes. These interventions need to consider dissemination during development. One framework that could guide this is the RE-AIM framework by Glasgow and colleagues [37, 38]. The focus on sustainable interventions with lasting effects is not unique to the MHBC area, and dissemination (or scalability) has been the focus of numerous calls for research; but these issues may be more salient for the MHBC field due to the increased and broader impact on chronic diseases.

The other area that was identified as most important is to identify predictors of MHBC. Predictors of single health behavior change are well studied for separate behaviors (e.g., smoking, physical activity, healthy eating, alcohol and substance use). It is less well known if these predictors transfer to a MHBC environment, such as self-efficacy to change several behaviors at once, or if there might be novel and unique predictors of MHBC. This priority illustrates the early stages of a research area and explains why the theory/mechanism topics were not rated as important. Once MHBC predictors have been identified and agreed upon, the mechanisms of how the predictors moderate and mediate each other to explain MHBC (i.e., MHBC theory) becomes more important to the field.

There are some MHBC research topics that were considered to be more of a priority for the underserved/minority population than for the general population. Specifically, when working with underserved/minority populations, the top 4 recommendations apply, but it is also recommended to focus on recruitment, retention, and measurement burden. For recruitment and retention of underserved and minority participants, studies should take extra consideration to make sure that the mode of communication and incentives are targeted specifically for the population in terms of their culture, resources, and preferences. Other helpful procedures would be to pre-schedule all assessments, send reminders, and covering the costs of transportation or lost wages upfront. To help with retention specifically, culturally appropriate methods of including the family or friends in continued involvement may be explored. For measurement burden in minority and underserved populations, evaluators should consider carefully the necessity of including all instruments. When cumbersome, measurement may be split across the sample so that some scales are given to half of the participants, and the other half receives another set of scales.

The exploratory analysis revealed a trend toward more senior researchers (either with respect to age, years involved in MHBC research, and years since terminal degree) rating theory items as more important compared to more junior researchers. This may be that more senior researchers value the usefulness of theory more based on their experiences, that as one progresses in their health behavior, research trajectory theory application becomes more prevalent, or that senior researchers may be more influenced by social desirability. This reasoning notwithstanding, from the theory perspective the recommendation is to conduct studies to understand the predictors of MHBC (see Noar, Chabot & Zimmerman “Applying health behavior theory to multiple behavior change: Considerations and approaches” [39] for good examples of this practice).

Limitations

This was a cross-sectional study conducted in Spring 2012 and therefore cannot determine the trends of experts opinions that may change or have changed over time. The sample was based on self-selected participants contacted through the SBM SIG listservs, largely limited to North America, and may not be representative of all behavioral scientists or experts in the field. Topics were pre-selected based on previous literature from 2008, which may have limited the scope and missed new MHBC developments; however, participants were given an option to provide their own research priorities, and no one utilized this option.

CONCLUSION

Research related to MHBC is a relatively new field of study. In the past 10 years, the need for research in this area has been recognized nationally, and research

programs utilizing MHBC are quickly multiplying. Thus, it was imperative to identify and prioritize MHBC research needs involving aspects of MHBC theory, measurement, and interventions. The findings from this study identified research priorities for all populations including sustainable interventions, the feasibility of disseminating interventions, evaluating the long-term effects of interventions, and understanding the predictors of MHBC. For the underserved/minority population, recommendations include the aforementioned top priorities but also should emphasize a focus on recruitment, retention, and measurement burden. The results document a rationale for the strategic advancement of this field by providing an empirical and expert consensus of the current research needs in MHBC science. Future research should follow up to determine if these research priorities are realized and continue to inform the field.

Implications

Findings and recommendations document MHBC research strengths and priorities, address gaps in the literature, provide a rationale for future research, and warrant follow-up to determine if priorities are addressed. However, the results of this study also have important implications for policy and practice. Clinicians and practitioners can apply evidence-based best practices for MHBC techniques by learning from MHBC research studies that emphasize theory-based, sustainable, feasible, and tailored efforts toward improving the lifestyles of their clients. Research utilizing MHBC interventions will inform policy by providing evidence on the reach, effectiveness, and economic implications of a multi-behavioral approach to preventive medicine.

Commentary on MHBC research directions

To increase the involvement in, the impact of, and the knowledge base about MHBC, behavioral scientists should increase communication across disciplines and research topics. For example, emphasis can be placed on attending interdisciplinary conferences and events and publishing in interdisciplinary journals. As these interdisciplinary partnerships are created and strengthened in the field, efforts should be made to unify a vision of the MHBC field. The development of a strategic plan for the growth the MHBC science that incorporates priorities identified in this study should give direction for progress in this field. For example, researchers could plan to investigate complementary hypotheses using comparable methods, or leaders in the field could plan workshops within their own institutions or in professional societies to identify MHBC science goals and benchmarks. Emphasis should be placed on sharing identified strengths as assets, such as sharing measurement tools and fostering collaboration on future proposals.

Acknowledgments: The authors would like to thank the participants for their contributions, Dr. Angela Sy for her guidance, and the Health Behavior Change Research Workgroup for their contribution.

Compliance with Ethical Standards All procedures followed were in accordance with the ethical standards of the responsible committee on human experimentation (institutional and national) and with the Helsinki Declaration of 1975, as revised in 2000. Informed consent was obtained from all patients for being included in the study.

Conflict of interest: The authors declare that they have no competing interests.

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